ORIGINAL ARTICLE

Diagnostic Accuracy of Alvarado Scoring System in the Management of Acute Appendicitis

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ABSTRACT

Objective: To determine the diagnostic accuracy of Alvarado Scoring System in the management of acute appendicitis.

Study design: This study was carried out in department of surgery LUMHS, Jamshoro, Hyderabad from January, 2007 to December, 2008.A total of 227 patients were included in this study. Patients were assigned Alvarado scoring system and divided into three groups. Group 1:(Score l-4)Immediate discharge and advise for follow-up. Group 2:(Score 5-7)Observational group. Group 3:(Score 8-10) Immediate appendectomy.

Result: Out of 227 patient, 108(47.6%) patients presented with migratory pain, 44(19.4%) presented with pain right iliac fossa, 21(9.2%) with pain in whole abdomen and 54(23.8%) with pain in para umbilical region. Out of 227 patients, 33(14.53%) had avarado score 1-4 and all patients discharged with advise for follow up and 3 patients readmitted and required surgical intervention. 49(21-59%) patients had inflamed score 5 and out of 49, 37 patients required surgical intervention and 12 patients discharge after 24 hours. 61(26.87%) had score 6-7 and all patients required surgical intervention. 84(37.1%)patients had score 8-10 and all underwent surgery. Out of 227 patients, 185 underwent surgery. Out of 227, 185 patients underwent surgery and out of these,145(78.06%) patients had acute inflammatory appendix and in 35(18.9%) patients, 18-94% appendix was found normal, 5(2.5%) patients having ruptured ovarian cyst, mesenteric cyst, lymph adenitis and meckles diverticulum. Specimen of‘ 147 patients, out of 185 operated, were submitted for histopathology. The normal appendix was found in 27(18.4%) patients and inflamed appendix was found in 120(81.6%) patients.

Conclusion: Alvarado scoring system is reliable, cheap, quick and handy tool in emergency department and in rural area, this system is helpful in diagnosis/ management of acute appendicitis.

Key words: Appendix, Alvarado score, appendectomy

INTRODUCTION

Appendicitis is a common and urgent surgical illness. It is most commonly seen in young and middle age[1] with male dominance[2]. To reduce the negative appendectomy rate, various scoring system have been developed for supporting the diagnosis of acute appendicitis. One such scoring system is Alvarado Score which is based on statistical analysis of symptoms/signs and laboratory data [3]. However, variations in clinical presentation occur according to the different positions of inflamed appendix[4]. Acute appendicitis some times may be difficult to diagnose. Appendices removed on clinical suspicion are reported histopathologically as normal mostly[5]. The acceptable normal appendectomy is considered to be quite a safe procedure, it is still associated with significant morbidity[8] and may cause complication in 6-18% cases[5]. The first case of appendectomy for acute appendicitis before rupture was reported by Senn in 1889[6]. Since then various studies have been carried out to assess negative appendectomy rates. A review by Richardson in 1899 revealed acute inflammation in only 58% of patients following appendicectomy[7]. Recent survey[6] have tended to give more conservative figure with a 5-27% incidence of normal appendices. Various studies both retrospective and prospective also conducted by different authers[8,9,10] and normal appendectomy rate varying from 7.2-40% reported. In one prospective study where diagnostic laparoscopy also carried out and out of 110 patients, 9 patients were saved from appendectomy on laparoscopy findings, the rate of negative appendectomy was 2.7%[9.]

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MATERIAL AND METHODS

This prospective and observational study was conducted in department of surgery, Liaquat University of Medical & Health Sciences, Jamshoro Hyderabad from January 2007 to December 2008 over a period of 2 years. A total of 227 patients were

included. Patients <10 years, generalized peritonitis, appendicular mass and perforated appendix were excluded from the study. All the patients were selected from surgical OPD and emergency department of Liaquat University of medical & Health Sciences, Jamshoro, Hyderabad, with the clinical diagnosis of acute appendicitis and were operated upon in emergency. A uniform system of history taking , physical, systemic, clinical examination were adopted for all patients. A structured & specially designed proforma with the subject of Alvarado scoring system showing in Table 1 was filled including general information and consent of patient. Based on clinical results, patients were divided in three group. Group I: (Score 1-4) Immediate discharge Group II: (Score 5-7) Observational Group Group III: (Score 8-10) Immediate appendectomy.

In group I, all patients treated conservatively and discharged to home with advice to follow up. In group II, all patients kept under observation for 24 hours and reassessed 6 hourly. Those who improve on conservative treatment were discharged to home while those not improved and the score increased then patients were included in group III.

RESULTS

227 patients with clinical features suggesting acute appendicitis were enrolled in the study. Details of results regarding avarado score, mode of treatment and post operative findings are given in tables 1,2,3.

Table 1: Alvarado scoring system

Features	Score
Symptoms	
Migratory RIF pain	1
Nausea/ vomiting	1
Anorexia	1
Signs	
RIF tenderness	2
Fever	1
Rebound tenderness in RIF	1
Laboratory test	
Leucocytosis	2
Neutrophilic shift to left	1
Total score	10

Table 2: Mode of treatment

Treat-ment	Group score			
	1-4 (n=33)	**5 (n=49)**	**6-7 (n=61)**	**≥8 (n=84)**
Opera-tive	3 (9.1%)	37 (75.5%)	61 (100%)	84 (100%)
Conser-vative	30 90.9%)	12 (24.5%)	0	0

Table 3: Post operative findings (n=185)

Postoperative findings	Group score				Total
	1- 4(n=33)	**5(n=49)**	**6–7(n=61)**	**≥ 8(n=84)**	
Inflammed appendix	3 (1.6%)	20 (10.8%)	40 (21.6%)	82 (44.3%)	145 (78.3%)
Normal Appendectomy	0	16 (8.6%)	19 (10.2%)	0	35 (18.9%)
Mesenteric lymphadenitis	0	1 (0.5%)	0	0	1 (0.5%)
Ruptured Ovarian Cyst	0	0	0	1 (0.5%)	1 (0.5%)
Meckel`s Diverticulitis	0	0	1 (0.5%)	0	1 (0.5%)
Twisted ovarian cyst	0	0	0	1 (0.5%)	1 (0.5%)
No Pathology found	0	0	1	0	1 (0.5%)

DISCUSSION

Acute appendicitis is one of the most common abdominal emergencies in surgery. However its diagnosis is not always straight forward. The dilemma of diagnosis is that some times the other conditions so closely mimic the appendicitis, that even the most experienced surgeons remove the normal appendix. According to sonic studies, a clinical decision to operate leads to removal of normal appendix in 15-30% cases[11]. But in this study, the incidence of removal of normal appendix was 18.6%. This ratio may be reduced by observing equivocal cases for a period of time but this reduction should not be at the cost of an increase in the number of perforation. This difficulty is due to our inability to reliably diagnose the appendicitis on clinical grounds[12].

Alvarado scoring system which is based on history, physical examination and laboratory investigation is easy to apply in comparison to other systems . The Alvarado scoring system first described in 1986, is simple scoring system that can be instituted easily in out patients setting. In comparison to some other studies, Alvarado score has been found a good aid in making the diagnosis of acute appendicitis[13]. It is a mathematical tabulation of common clinical signs and symptoms found in patients of acute appendicitis.

Our data showed that the majority of patients suffering from acute appendicitis were young patients. Half of the patients were less than 30 years of age. Majority were between 20-24 years of age. However we compare our results with those reported in other countries[14].

Regarding the sex, males had higher incidence of acute appendicitis than females in nearly all age

groups. Here males have a 1.94 times greater risk of having acute appendicitis than female which is in agreement with other studies15. In this study, all the patients complained of pain, 108 patients presented with typical migratory pain, 38 with pain right iliac fossa, 60 complained of para umbilical pain while 21 presented with pain whole abdomen. Out of 227 patients, 156 were having fever. Anorexia is an important and prevalent symptom in acute appendicitis in this study i.e., 80.7%.This is comparable to other studies[14,15].

In our study, 153(67.4%) patients presented with nausea or vomiting which is comparable with Chang (1981)[14]. In this study, 185 (81.49%) out of 227 patients with suspected acute appendicitis underwent appendectomy. Of those operated, 35 (18.94%) patients were found to have normal appendix while 5(2.7%) had other pathologies. So total patients with normal appendix were 35 (18.94%). Hence, the negative appendectomy rate in our studies was (18.94%) which is comparable with other studies[15].

None of the patients in this series with a score of below 4 had appendicitis. If this was used as admission criteria, 33 patients with score of 3 and 4 would have required admission and follow up. Forty Nine patients with score of 5 were admitted in hospital, of which 37 patients required appendectomy. The remaining 12 patients, who were females, were discharged on conservative treatment. This highly suggests that patients with Alvarado Score of 4 or less have no appendicitis and thus no surgical intervention. While patients with the score of 5 or above will probably require surgical intervention.

It is also important to emphasize that the scoring may not be accurate in patients who are unable to give proper history, such as very young, or those with communication problem 35. Eighty four patients in this study were in the score of 8-10, all underwent emergency surgery and were found to have acute appendicitis or its complications. The main aim of clinical decision making process is to reach the exact diagnosis in the fastest and cheapest way. The best surgeon decides the best management in cost effective manner.

Surgery should no longer be scalpel - happy when faced with a patient of possible acute appendicitis since rupture prevention by 'early' surgery is only an assumption. Periodic assessment of patients placed in a structured observation program, on the other hand is of proven value in patients management and it is probably unwise to make the final decision of surgery just on the basis of single examination. The limited availability of medical imaging technology and confinement to a rural region make clinical evaluation a primary diagnostic tool.

CONCLUSION

Acute appendicitis is a diagnostic challenge for the surgeons in spite of having radiological investigations in the modern era; there is no laboratory or radiological test which can reliably diagnose the condition. Alvarado scoring system is found to be helpful in the diagnosis and management of acute appendicitis. Diagnosis virtually confirms with score of 7-10 especially in males and they should undergo appendectomy. Patients with score of 5-6 may be admitted and scored frequently. Scores of 1-4 may be discharged. Testing of score in a new clinical environment before surgery can be recommended. The existing score can be recommended as a standard tool for diagnostic decision making in acute appendicitis. Alvarado Scoring system is a reliable, cheaper and handy tool in diagnosis of acute appendicitis.

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